NAVAL WAR COLLEGE
Newport, R.I.

MINE COUNTERMEASURES: WHAT THE OPERATIONAL COMMANDER MUST KNOW

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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17 June 1994

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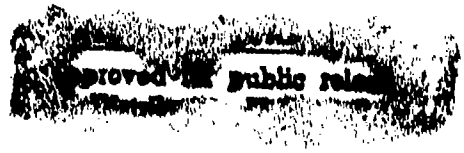

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SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION OPERATIONS DEPARTMENT 6b. OFFICE SYMBOL (If applicable) C	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State, and ZIP Code) NAVAL WAR COLLEGE NEWPORT, R.I. 02841	7b. ADDRESS (City, State, and ZIP Code)
8a. NAME OF FUNDING / SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)

MINE COUNTERMEASURES: WHAT THE OPERATIONAL COMMANDER MUST KNOW (U)

12. PERSONAL AUTHOR(S)

LCDR KEVIN T. HOLDEN, USN

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
FINAL	FROM _____ TO _____	8 FEB 94	34

16. SUPPLEMENTARY NOTATION A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

17. COSATI CODES		
FIELD	GROUP	SUB-GROUP

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

MINE THREAT; OFFENSIVE AND DEFENSIVE MCM; CAPABILITY; OPERATIONAL CONSIDERATIONS

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

A GREAT DEAL HAS BEEN WRITTEN CONCERNING THE NEED FOR MORE AND IMPROVED MINE COUNTERMEASURES EQUIPMENT. WHAT SEEMS LACKING IS ADEQUATE FOCUS AT THE OPERATIONAL LEVEL REGARDING HOW TO EFFECTIVELY AND EFFICIENTLY EMPLOY EXISTING SYSTEMS IN SUPPORT OF CURRENT AND FUTURE OPERATIONS. IN MANY SITUATIONS, TO ACHIEVE A MILITARY OBJECTIVE, IT IS ESSENTIAL THE OPERATIONAL COMMANDER KNOW THE EXISTING OR POTENTIAL MINE THREAT, UNDERSTAND CURRENT MINE COUNTERMEASURE CAPABILITIES, DETERMINE THE AVAILABLE COURSES OF ACTION, AND SELECT THE COURSE OF ACTION THAT WILL PROVIDE THE HIGHEST PROBABILITY OF SUCCESS IN SUPPORT OF AN ASSIGNED MISSION. THIS PAPER IS INTENDED TO EMPHASIZE THE IMPORTANCE OF MINE COUNTERMEASURES TO THE OPERATIONAL COMMANDER. IT DRAWS UPON THE LESSONS OF HISTORY TO SHOW THAT MINE WARFARE HAS HAD A SIGNFICANT IMPACT ON NAVAL AND JOINT OPERATIONS. WHILE THE PAPER ADDRESSES SOME TECHNICAL AND TACTICAL ASPECTS OF MINE COUNTERMEASURES, THE PRIMARY FOCUS IS ON THE OPERATIONAL CONSIDERATIONS AND OPTIONS AVAILABLE TO THE OPERATIONAL COMMANDER.

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL CHAIRMAN, OPERATIONS DEPARTMENT	22b. TELEPHONE (Include Area Code) 841-3414 / 22c. OFFICE SYMBOL C

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted. All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

★U.S. Government Printing Office 1988—539-013

Abstract of
MINE COUNTERMEASURES: WHAT THE OPERATIONAL COMMANDER MUST KNOW

A great deal has been written concerning the need for more and improved mine countermeasures equipment. What seems lacking is adequate focus at the operational level regarding how to effectively and efficiently employ existing systems in support of current and future operations. In many situations, to achieve a military objective, it is essential the operational commander know the existing or potential mine threat, understand current mine countermeasure capabilities, determine the available courses of action, and select the course of action that will provide the highest probability of success in support of an assigned mission.

This paper is intended to emphasize the importance of mine countermeasures to the operational commander. It draws upon the lessons of history to show that mine warfare has had a significant impact on naval and joint operations. While the paper addresses some technical and tactical aspects of mine countermeasures, the primary focus is on the operational considerations and options available to the operational commander.

PREFACE

In researching this paper I found little in the form of open writing on the subject of mine warfare; specifically, that segment of mine warfare known as mine countermeasures. The material that I have drawn upon can be placed in four groups (1) historical accounts, (2) Naval Warfare publications, (3) Joint Warfare publications, and (4) articles in unofficial periodicals such as U.S. Naval Institute *Proceedings* and *Marine Corps Gazette*. Due to the resurgence of interest in mine countermeasures in the 1980's, the majority of the sources listed in the bibliography were written between 1988 and the present.

I have considered the comments and insights of many individuals with varying degrees of experience in mine countermeasures, or the impact of mining on military operations. Although I am not a mine warfare specialist, I do have an understanding of the complexity of the problem. I have drawn upon twelve years of experience as a surface warfare officer and most recently the perspective gained while operating in the mined waters of the northern Persian Gulf during Desert Storm.

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CHAPTER I

INTRODUCTION

The National Security and National Military Strategies of the United States are built upon the four foundations of Strategic Deterrence and Defense, Forward Presence, Crisis Response, and Reconstitution.[1] Of these, Forward Presence and Crisis Response depend heavily on the Navy meeting its operational objective of gaining and maintaining Battlespace Dominance. Simply stated, battlespace dominance means we must maintain access from the sea to permit the effective entry of troops, equipment, and resupply.[2] It is fair to say the concept of battlespace dominance is very similar to the idea of sea control that has always been a major mission of the Navy. In attempting to achieve control of the seas throughout its history of conflict, the United States has frequently encountered a very formidable and complex threat - the use of naval mines. In fact, dating from the Civil War up to and including Desert Storm, the naval mine was frequently used to deny access, channel shipping, and alter plans and operations.

In view of the significant impact mining or the threat of mining can have on military operations, it would be incorrect to assume mine countermeasures (MCM) is entirely the responsibility of the Navy. Clearly the Navy is charged with the responsibility to acquire the equipment and maintain the

capability to counter naval mines; however, from crisis recognition to crisis resolution the operational commander must be actively involved in the MCM operation.

To ensure the successful accomplishment of a military operation it is essential the operational commander have a working knowledge of mine countermeasures. Specifically, the commander must recognize the impact mining can have on a wide range of operations, be familiar with the characteristics of naval mines, understand the basic concepts of MCM, know the current MCM capabilities, and focus on the operational considerations critical to the success of the MCM operation.

History has demonstrated the failure to adequately address the mine threat can jeopardize the success of military operations and ultimately the attainment of political objectives. Consequently, the operational commander must make mine countermeasures an operational concern and not treat it as a tactical undertaking of assigned naval forces.

CHAPTER II

LESSONS LEARNED

Mine Warfare in America began with David Bushnell's attempts to attach explosive charges to the hulls of British ships during the American Revolution. Bushnell later attempted to destroy the British fleet above Philadelphia with the use of contact-primed kegs of powder.[1] Although both efforts achieved little success, they did signal the emergence of a new and potentially effective weapon.

Civil War. The Confederate States quickly realized, lacking a navy, the only way they could effectively protect their vast coastline was to employ mines. Statistics illustrate the Confederate mining efforts were remarkably successful in terms of sinkings, damage inflicted, delays caused, and occasionally the Union's failure to attack.[2] Defensive mining by the Confederacy provided the world with a lesson that remains valid for today and the future - mine warfare is appealing to nations with small navies and limited resources.

World War I. Although the United States had accomplished little in mine warfare before this point, other nations had been busy improving their mine capabilities.[3] At the outbreak of the war the Russians, the Germans, and the British were

equipped to use mines in the conduct of the war. The Russians mined the entrance to the Gulf of Finland and successfully protected St. Petersburg from attack from the sea. The Germans employed some defensive mines in the waters surrounding the approaches to the homeland, but the major thrust was the offensive mining of the coast of England.[4] Initially the British laid mines in the English Channel to oppose the German mine laying U-boats. Later they began mining the North Sea - a task that would occupy them until the end of the war.[5]

Hoping to attack Germany from the south, drive a wedge between the Central powers of Turkey and Bulgaria, and open lines of communication to Russian allies, the British attempted to transit through the narrow Dardanelles. Complicating this operation was the fact the Turks had continuously mined the straits since the start of the war. In addition, the area was protected by heavy guns and searchlights. Despite great effort and sacrifice the British were unsuccessful in their attempts to navigate the straits.[6] This experience demonstrated both the supporting role of MCM and the necessity of support for the MCM operation. The Royal Navy could not pass through the straits until the mines had been cleared, the mines could not be cleared until the heavy guns were destroyed, and the guns could not be destroyed without the army or special forces ashore.[7]

The extensive British and American mining of the North Sea displayed another valuable MCM lesson. Following the war an equally comprehensive MCM effort was undertaken. Even in

uncontested waters with known minefields a major commitment of MCM assets, creative methods, and significant logistical support was required. Despite a massive effort, the MCM forces accounted for only 40 percent of the mines laid.[8]

World War II. In early 1942 German U-boats laid several hundred mines in the waters off Delaware Bay; Chesapeake Bay; Jacksonville, Florida; and Charleston, South Carolina.[9] Even with the employment of available MCM forces, this and subsequent mining efforts were effective in restricting traffic in critical harbors for as much as sixteen days.[10]

The allied invasion of France required significant attention be given to the mine problem throughout the planning and execution phases. As a precursor to the invasion the allies conducted night attacks to prevent intensive German mining of the English Channel. Despite this effort mines were expected to pose a larger problem in the French harbors. However, intelligence had incorrectly identified the threat as contact mines vise the more dangerous and challenging influence mines that were encountered.* Despite a large MCM effort, the Allies lost combatant ships and landing craft in the invasion. This operation pointed to the importance of offensive MCM and accurate intelligence on the expected threat.** It also

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*Various methods of mine actuation are described on pages 11-12.

**Offensive MCM is explained on page 14.

demonstrated, once again, no amount of effort will guarantee 100 percent clearance; therefore, the operational commander must decide what level of risk is acceptable in the execution of the mission.

In the Pacific the United States mining campaign against Japan was conducted in two phases. First, in 1942, 13,000 mines were laid in the over 150 harbors and channels of the extended Japanese empire. Secondly, in 1945, 12,000 mines were laid in the home waters surrounding Japan. After the war Japanese naval officers said the mining effort and the damage it inflicted on their merchant fleet had helped strangle the nation.[11] These mining campaigns illustrate the vulnerability of a nation that is (1) heavily dependent on the sea for vital resources and (2) has overseas operations that are equally dependent on naval support and logistics support.[12]

Korean Conflict. The most significant use of mining by the North Koreans was in the area around Wonsan harbor. The beaches at Wonsan were to be used for an amphibious assault by the U.S. Marine Corps. In advance of the landing, limited intelligence denied the operational commander a clear picture of the enemy mining operation; consequently, the MCM effort proved to be costly, difficult, and time consuming. General MacArthur had allotted the naval forces five days to clear the approaches for the assault; however, due to limited knowledge of the threat and lack of adequate MCM assets the job took

fifteen days to complete. Of the nearly 3,000 mines originally planted, only 225 had been swept and destroyed.[13] Although the channels had been cleared for the assault, the delay resulted in the main U.N. forces advancing overland into the Wonsan area before the amphibious landing. The Wonsan operation pointed again to the need for accurate intelligence, the need for adequate MCM forces, and the inability to completely clear an area of mines. Wonsan also showed the United States can be denied freedom of movement through the intelligent use of mines by an alert foe.[14]

Vietnam. The North Vietnamese relied heavily on mines to restrict the movement of shipping on internal waters, and often coordinated mining with gunfire and rocket attacks.[15] To successfully clear mines it was essential for the MCM forces to operate jointly with patrol craft and ground forces for protection. Once again, the requirement for support of the MCM forces was demonstrated.

The mining of Haiphong harbor was an offensive effort carried out by the United States that showed the effectiveness, ease of delivery, and economy of a coastal mine campaign. Continued remining and bombing of North Vietnam influenced negotiations in Paris as the United States increased military pressure on the North Vietnamese to negotiate a settlement.[16] Since North Vietnam lacked any credible MCM capability, part of the agreement process required U.S. forces clear Haiphong

harbor and its approaches. The campaign proved again the vulnerability of a country that is dependent on sea lines of communication and has little or no MCM capability.

Desert Shield / Desert Storm. One of Iraq's most effective threats was the naval mine. After the cease fire, Iraq reported it had laid 1,167 mines during the conflict.[17] These mines (1) denied Coalition forces sea control in the northern Persian Gulf, (2) interfered with sealift and logistics support, (3) acted as a significant distraction to the coalition forces operating in the central and southern Persian Gulf, (4) prevented the battleships USS *Wisconsin* (BB-64) and USS *Missouri* (BB-63) from maneuvering freely to provide gunfire support to the forces ashore, and (5) greatly contributed to the decision not to conduct an amphibious attack on the Kuwaiti coast.

Before the start of the war, the ability of the U.S. forces to gather intelligence on the Iraqi minefield locations, or observe and counter Iraqi minelaying activity in international waters was degraded by restrictions on naval and air operations in the northern Persian Gulf.[18] President Bush would not allow U.S. forces to take any offensive action against the Iraqis before the 15 January U.N. deadline for their withdrawal from Kuwait.[19]

Operational commanders in future conflicts must make the case for close monitoring and intelligence collection on enemy

mining activity, destruction of mine stockpiles and production facilities, and destruction of minelayers. The failure to plan and coordinate MCM operations could result in failure to achieve the military objective. I would caution commanders not to look at Desert Storm as the example for the future - what if, for political or military reasons, an amphibious assault had been the only option available for inserting ground forces into Kuwait?

The above case studies do not provide a complete or detailed analysis of mine countermeasures, nor was that my intention. I have purposely avoided any discussion of technical and tactical developments in either mining or mine countermeasures. The key points to consider are (1) mines are an attractive weapon to many nations, (2) mines can be very effective, and (3) successful MCM requires planning and joint effort if it is to support the overall mission. The operational commander must recognize even a single mine - or a report of one - ties up considerable resources and imposes severe restraints on operational movements.

CHAPTER III

OVERVIEW OF MINE THREAT

To appreciate the complexity of the mine problem and its potential impact on military operations, the operational commander must have a basic understanding of mines. Mine types are classified according to the position they assume in the water, method of delivery, and method of actuation.

Position. When classified according to the position they assume in the water, mines fall into three categories: bottom mines, moored mines, and drifting mines.

Bottom mines are most effective when used in shallow water. In very deep waters, surface vessels may pass over the mine without actuating its firing mechanism or, in the event it detonates, without suffering damage. Of course, bottom mines planted in deep waters could still damage or sink a submarine.

Moored mines are designed for deep water placement and are effective against submarines and surface ships. The explosive charge and firing mechanism are housed in a positive buoyancy case. A cable, attached to an anchor on the sea bottom, holds the case at a predetermined depth below the surface.

Drifting mines float freely at or near the surface. They have no anchoring devices, and their buoyancy is approximately neutral. The Hague Convention of 1907 limited the use of drifting mines to those armed with a sterilizer that disarms

them within one hour of release. In addition, the signatories to the convention agreed, for the protection of neutral ships, all moored contact mines would be designed to sterilize if they broke free of their moorings.[1] As a practical matter, the moored contact mines which broke free or were set loose in the Persian Gulf from 1987-1988 and again during Desert Storm did not sterilize and were in effect drifting mines.

Method of Delivery. When classified according to the method by which they are delivered, mines again fall into three categories: aircraft-laid mines, submarine-laid mines, and surface-laid mines.

Aircraft delivered mines are normally employed in offensive operations and are dropped from aircraft in a manner similar to a bomb. Aircraft provide the capability for replenishing minefields over an extended period without exposure to existing mines. In addition, aircraft are capable of laying mines in enemy held inland waters.

Submarine delivered mines, normally used in offensive operations, are specially configured mines launched from the torpedo tubes of submarines. Although submarines are limited in the number of mines they can deliver, they have the advantage of covert placement.

Surface delivered mines can be deployed from almost any size or type surface vessel. Surface laying is the most economical method of delivery because of the relatively large

number of mines that can be carried.

Method of Actuation. Mines that are classified according to method of actuation fall into three groups: contact mines, influence mines, and controlled mines.

Contact mines are the oldest and perhaps the most commonly known mine type. These mines use contact mechanisms to initiate the firing sequence. For this type, physical contact between the mine and target must occur. These relatively simple mines were effectively used in the Persian Gulf between 1987 and 1988 and again following the Iraqi invasion of Kuwait.

Influence mines are more complex and difficult to counter. These mines are actuated by either the magnetic, acoustic, or pressure signatures presented by a ship or submarine as it moves through the water. More advanced mines use a combination of influence detectors to increase the probability of kill.

Controlled mines, traditionally used in defensive minefields, receive firing signals through hard wired control cables from land-based control sites. The North Vietnamese used a crude variant of this mine type against U.S. forces and shipping on the rivers of Vietnam.[3]

CHAPTER IV

CLASSIFICATION OF MINE COUNTERMEASURES

As a foundation on which to build a working knowledge of MCM, the operational commander must be familiar with the definition of MCM and methods of MCM available for use across the spectrum of conflict.

Mine countermeasures include all actions undertaken to prevent enemy mines from altering the plans or operations of friendly forces. These actions are classified according to the force that accomplish them, the degree to which the effort directly acts against a given mine threat, the methods used to do so, and the specific objective of the effort.

Mine countermeasures are divided into two broad categories: offensive and defensive MCM.*

Offensive MCM. Offensive MCM is the most effective way of countering the mine threat. It requires the destruction of enemy mine manufacturing and storage facilities or mine laying platforms before the mines are laid. These operations are not conducted by MCM forces; therefore, the operational commander must ensure that these facilities and assets are considered for inclusion on the joint target list.

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*In Joint terminology these are proactive and enabling MCM respectively. U.S. Joint Chiefs of Staff., Doctrine for Barriers, Obstacles, and Mine Warfare, JOINT PUB 3-15 (Washington: 1993), p. IV-10.

Defensive MCM. Designed to counter the mines once they are laid. Most defensive MCM operations are executed during the conflict to permit other maritime operations, such as power projection, to be conducted. However, some operations are undertaken following the conflict to eliminate or reduce the residual threat to shipping. Defensive MCM includes passive and active MCM.

Passive MCM reduce the threat from mines that have been laid without physically attacking the mine. The three primary methods used to accomplish this task are (1) localization of the threat, (2) detection and avoidance of the minefield, and (3) risk reduction techniques practiced by individual ships.

Active MCM are applied when passive measures alone cannot protect traffic. This requires physical interference with the explosive functioning of the mine or actual destruction of the mine. Minehunting and minesweeping are the primary methods employed in active MCM. Both require detailed intelligence and planning by the operational commander and the MCM commander to counter the threat effectively.

Minehunting involves the use of mine detection and neutralization systems to counter individual mines. This method is preferred if time permits. Minehunting poses less risk to the MCM forces, covers an area more thoroughly, and provides a higher probability of mine detection than minesweeping.

Minesweeping is conducted by either surface craft or

aircraft and involves the towing of mechanical or influence sweep systems. Mechanical sweeping is designed to sever moored mine cables and bring the mine to the surface for destruction. Influence sweeping involves the use of towed devices that emit acoustic, magnetic, pressure or a combination of these signals to trigger influence mines.

CHAPTER V

MINE COUNTERMEASURES CAPABILITY

It is unlikely, with the possible exception of the Persian Gulf, MCM forces will be on station to support the operational commander in his area of responsibility (AOR) before the development of a crisis or the outbreak of hostilities. Consequently, it is essential the operational commander be informed about the type, capability, and availability of the MCM forces the Navy can provide. The operational commander must make the initial assessment of the mine threat and request the type of MCM support required to execute his mission according to the prescribed timeline.

Commander Mine Warfare Command (COMINEWARCOM) has organized the Navy's MCM forces into two MCM Groups (MCMGRUs ONE and TWO). Each MCMGRU includes Air units (AMCM), Surface units (SMCM), and Underwater units (UMCM) consisting of Explosive Ordnance Disposal (EOD) teams. Currently COMINEWARCOM has two ready to deploy forces that consist of four SMCM units, six AMCM units, and four EOD detachments. Each MCM group commander and staff can deploy as a mine warfare battle staff. Additionally, for major contingencies, COMINEWARCOM can deploy as a mine warfare liaison group to the joint staff in command.[1]

SMCM. The SMCM forces presently operate the MCM-1 *Avenger* class and the MHC-51 *Osprey* class ships plus a remotely

controlled self-propelled acoustic and magnetic (SAM) minesweeping system. Each ship type is equipped for minehunting with a mine detection sonar and a mine neutralization system. The *Avenger* class has the added capability to conduct mechanical sweeping of moored and influence mines.

Surface MCM units afford the following advantages: long on-station time, enhanced minehunting and minesweeping capabilities, permit immediate mine neutralization, conduct deep hunting and sweeping, and provide on-scene support for AMCM and UMCM assets. The major disadvantage is their slow transit speed (10-12 knots); however, the impact of this problem can be lessened through the use of contracted heavy lift vessels. The latter method of deployment can reduce transit time by as much as fifty percent.

AMCM. Air MCM squadrons operate the MH-53E helicopter. This aircraft is capable of conducting shallow water minehunting and neutralization as well as mechanical and influence sweeps.

Air MCM offers the operational commander the following advantages: rapid deployment (operational within 2-3 days), rapid reconnaissance of suspected mine danger areas, and high speed minesweeping as a precursor to SMCM and UMCM (reducing the risk to these forces). Among its principle disadvantages are: inability to conduct deep water MCM, weather restrictions,

minehunting systems that are less capable than SMCM units, and a large maintenance and logistics requirement.

UMCM. As it relates to MCM the EOD mission is centered on three operational requirements; mine location and identification, mine recovery and evaluation, and mine neutralization. These forces are designed for rapid deployment, covert reconnaissance and clearance, and shallow water operations.*

*Naval Special Warfare forces are tasked to conduct mine clearance in the shallow / very shallow water approaches to the beach before an amphibious assault.

CHAPTER VI

OPERATIONAL CONSIDERATIONS

The operational commander responsible for overseeing the planning and execution of mine countermeasures must consider a number of factors that could affect the outcome of the operation. He must remain actively engaged in the decision process and make the final judgement on several critical aspects of the operation.

Intelligence. History has provided many examples of MCM operations that suffered due to lack of adequate intelligence. It is imperative national and theater level intelligence assets be directed to collect information on the potential or existing mine threat. Information on the types of mines, quantities of mines, and number and locations of minefields should be determined before the MCM operation. In addition, intelligence on the location of manufacturing facilities, storage sites, and mine laying platforms provides the option to conduct offensive operations. If offensive MCM is not permitted, it is at least possible to keep track of the activity around the mine facilities and mining platforms.

MCM Objective. The objectives the commander can choose from are: exploratory, reconnaissance, breakthrough, attrition, and clearance. The objective of exploration is to determine

whether or not mines are present. Reconnaissance operations are used to determine mine types, number of mines, and extent of the mined area. Breakthrough operations are directed when a rapid operation is required to open channels for port break-in or break-out, or provide staging areas for an amphibious operation. Attrition is designed to keep the threat to traffic as low as possible when traffic must continue to transit the mined waters and mines cannot be cleared in a short time. The objective of clearance operations is to attempt to remove all mines from a designated area.

Risk Assessment. Some MCM techniques are inherently risky when used against certain types of mines. To determine the proper MCM technique, the MCM commander must be given an indication of the maximum acceptable degree of risk to the MCM forces. The operational commander must balance the necessity of completing one operation with the requirement to have MCM assets available for follow-on missions.

Percentage of Clearance. Percentage clearance (P) is the principle numerical value used by the planners and evaluators to determine the amount of time and number of assets required to clear a particular type of mine. The value for (P) is the responsibility of the operational commander. Higher values of (P) require more time and resources; therefore, the commander must balance this against the need to accomplish the overall

mission by a specified date. In essence, the commander is required to determine the acceptable level of risk to the assigned ships and/or landing force.

MCM Force Protection. The MCM force has very little self-defense capability against enemy ships, aircraft, or shore defenses. During the planning phase, the operational commander must ensure the required level of sea-air-land support is provided to the MCM force. Theater MCM assets may be in short supply and should not be exposed to unnecessary risk from hostile fire - with the exception of mines.

Amphibious Operations. Desert Storm demonstrated the deceptive value of exercising a large amphibious force at sea in the vicinity of enemy held territory. However, this should not be considered the new Navy and Marine Corps mission. There will probably be a need to execute an amphibious raid or assault across an unfriendly beach in the future. Certainly the preference would be to avoid operating in mined waters, but this is not always possible.

In addition to those considerations already presented, the operational commander will need to evaluate some unique aspects of MCM as they relate to amphibious operations. First, in selecting a landing site, the size of the required Amphibious Operating Area (AOA) must be balanced against the MCM assets available and the time allotted to complete the MCM operation.

Secondly, the need to conduct a covert assault from over the horizon may make it very difficult to conduct conventional MCM in advance of the force. It may be necessary to conduct rapid lead-through type operations - recognizing the risk to the force increases markedly. One option available if covert action is required would be to insert Navy Special Operations forces into the AOA for the purpose of reconnaissance, marking, and mine destruction - this would probably be marginally effective in a small AOA. The last major aspect of MCM in the AOA is the difficulty in countering mines in the very shallow water and surf zones. At present the only effective method is to employ the Navy Special Operations forces.

Q-Routes. A Q-Route is a preplanned system of shipping lanes that can be activated by the operational commander if mining has occurred. By making use of extensive route surveys conducted prior to the mining, the MCM force can rapidly verify the presence of mines in the designated routes and take appropriate clearance action. If there are no Q-Routes in a particular AOR and mining is a possibility, the operational commander should request they be established to keep the sea lines of communication open.

Support Requirements. Ultimately, COMINEWARCOM is responsible for rapid deployment and sustainment of the MCM forces. However, in the initial stages of the operation it may

be necessary for the operational commander to procure or allocate facilities and provide essential logistics for the AMCM and SMCM units.

Command, Control, and Communication. It is essential that communications connectivity exist between all supporting and supported forces involved in the MCM effort. After arriving on scene, the MCM battle staff should be given primary responsibility for planning and executing the MCM operation, but must maintain a very close relationship with the operational commander.

Multinational Force Coordination. Mine countermeasures operations have frequently been conducted by multinational forces. In order to conduct these safely and efficiently, agreements to coordinate AORs and communications is needed to prevent mutual interference.

Rules of Engagement. The operational commander must remain attentive to the requirement for offensive MCM and request permission to conduct those operations before the enemy has deployed its mines.

Mine countermeasures is a complex, difficult, time intensive, and essential mission. Therefore, successful MCM operations are dependent on the active participation of both the operational commander and the MCM commander.

CHAPTER VII

CONCLUSION

Achieving and maintaining battlespace dominance over the open ocean and the littoral regions of the world is a vital element of our continued success as a global leader. In peace, our maritime superiority enhances our deterrent capabilities. In war, it is critical to the conduct and successful termination of conflict. Extended supply lines demand the unimpeded flow of assets. The ability to quickly establish control of the sea en route and in the theater of operations provides for increased combat effectiveness, fewer losses, and efficient employment of combat power when and where it is needed most.[1]

Although mine countermeasures is only one factor in the complex task of establishing effective battlespace dominance; clearly, it is a significant part of the equation. It is for this reason that the Navy embarked on an extensive program to invigorate its mine countermeasures capability. Specifically, it has reorganized all MCM forces under a single commander, collocated all forces to ensure maximum training and readiness, embarked on a healthy ship and aircraft construction program, and is actively engaged in research and development of MCM technologies.

The result of the Navy's attention to MCM is the enhanced capability provided the operational commander. It is this

capability the commander must intelligently employ in support of military operations. If the MCM force is viewed as a tool in the operational tool kit and not simply a tactical asset, the likelihood of operational success will increase.

To employ MCM to its maximum advantage the operational commander must:

- Determine what impact mining could have on a particular operation.

- Understand the capabilities of the mines in the enemy stockpile and anticipate when and how they will be employed.

- Understand the basic concepts of MCM to facilitate decisions about the objective of the effort and methods available to complete the MCM operation.

- Know the capabilities of the MCM force and request assets necessary to support the required military operation. Understand the time considerations when developing plans - time to get on station, time required to be operationally ready, and time needed to achieve the designated level of clearance.

- Gather all available intelligence on the existing or potential threat.

- Asses risk to the MCM force and the assigned ships and landing force.

- Provide for protection of the MCM force.

- Know the risk and understand the complexity of conducting an amphibious landing in mined waters. Balance the time required to conduct MCM with the need to get troops ashore.

- Provide for command, control, and communication between own and coalition forces.

Mines of various sophistication are developed and manufactured by many countries. In addition, international weapon sales have resulted in mines being available to just about any country that desires to use them to achieve their aims. This results in the likelihood of mines being used in future crises or conflicts. In view of the impact mines can have on military operations, it is essential that the operational commander know and execute his responsibilities wisely.

NOTES

Chapter I

1. U.S. Joint Chiefs of Staff, National Military Strategy of the United States (Washington: 1992), p. 6.

2. U.S. Navy Dept, ...From the Sea: Preparing the Naval Service for the 21st Century (Washington: 1992), p. 8.

Chapter II

1. Tamara M. Melia, "Damn the Torpedoes A Short History of U.S. Naval Mine Countermeasures, 1777-1991 (Washington: U.S. Government Printing Office, 1991), p. 7.

2. Gregory K. Hartman and Scott C. Truver, Weapons That Wait: Mine Warfare in the U.S. Navy, Updated ed. (Annapolis, MD: Naval Institute Press, 1991), p. 33.

3. Ibid., p. 37.

4. Ibid., pp. 42-43.

5. Melia, p. 28.

6. Ibid., p. 29.

7. Hartman and Truver, p. 47.

8. Melia, pp. 37-38.

9. Ibid., p. 51.

10. Hartman and Truver, p. 71.

11. Melia, p. 63.

12. Hartman and Truver, p. 71.

13. Malcolm W. Cagle and Frank A. Manson, "Wonsan: The Battle of the Mines," U.S. Naval Institute Proceedings, June 1957, p. 609.

14. Ibid., p. 611.

15. Melia, p. 92.

16. Ibid., p. 101.

17. U.S. Dept. of Defense, Conduct of the Persian Gulf War: Final Report to Congress (Washington: 1992), p. 247.

18. Ibid., p. 282.

19. Bernard E. Trainor, "Still go-ing...Amphibious Warfare," U.S. Naval Institute Proceedings, November 1992, p. 32.

Chapter III

1. Tamara M. Melia, "Damn the Torpedoes" A Short History of U.S. Naval Mine Countermeasures, 1777-1991 (Washington: U.S. Government Printing Office, 1991), p. 27.

2. Ibid., p. 92.

Chapter V

1. Michael S. Giauque, "Shaping the New Mission," Surface Warfare, July/August 1992, pp. 8-9.

Chapter VI

1. U.S. Joint Chiefs of Staff, National Military Strategy of the United States (Washington: 1992), p. 9.

BIBLIOGRAPHY

Blickensderfer, Thomas L. "Amphibious Mines: Silent Enemy of the Landing Force." Marine Corps Gazette, November 1992, pp. 84-87.

Brown, David K. "Damn the Mines!" U.S. Naval Institute Proceedings, March 1992, pp. 45-50.

Brown, David K. and Foxwell, David. "The Gulf War in Review, Report from the Front: MCM and the Threat Beneath the Surface." International Defense Review, July 1991, pp. 735-738.

Cagle, Malcolm W. and Manson, Frank A. "Wonsan: The Battle of the Mines." U.S. Naval Institute Proceedings, June 1957, pp. 598-611.

Fortin, Ernest. "Those Damn Mines." U.S. Naval Institute Proceedings, July 1992, pp. 30-34.

Friedman, Norman. Desert Victory: The War for Kuwait. Annapolis, MD: Naval Institute Press, 1991.

Giauque, Michael S. "Shaping the New Mission." Surface Warfare, July/August 1992, pp. 8-11.

Greer, William L. and Bartholomew, James C. "Psychological Aspects of Mine Warfare." Unpublished Research Paper, Center for Naval Analyses, Alexandria, VA: 1982.

Hartman, Gregory K. and Truver, Scott C. Weapons That Wait: Mine Warfare in the U.S. Navy. Updated ed. Annapolis, MD: Naval Institute Press, 1991.

Hayes, Bradd C. "Keeping the Naval Service Relevant." U.S. Naval Institute Proceedings, October 1992, pp. 57-60.

Kelso, Frank B. "Building Blocks of Naval Power." U.S. Naval Institute Proceedings, November 1992, pp. 39-44.

Martin, J.M. "We Still Haven't Learned." U.S. Naval Institute Proceedings, July 1991, pp. 64-68.

Melia, Tamara M. "Damn the Torpedoes" A Short History of U.S. Naval Mine Countermeasures. Washington: U.S. Government Printing Office, 1991.

Naval Mine Warfare Engineering Activity. U.S. Navy Mine Countermeasures Familiarizer. Yorktown, VA: 1991.

_____. NAVSEA Mine Familiarizer. Yorktown, VA: 1985.

Prina, Edgar L. "Navy Moves to 'All Ahead Flank' in Mine Warfare." Sea Power, May 1992, pp. 27-28; 33-35.

Shelley, Marke R. "A Better Game of Dodge'n Detonate." U.S. Naval Institute Proceedings, February 1988, pp. 41-43.

"The Path Ahead for 'Gators and Marines: Interview with Rear Admiral J.B. LaPlante, USN." U.S. Naval Institute Proceedings, November 1992, pp. 34-38.

Trainor, Bernard E. "Still go-ing...Amphibious Warfare." U.S. Naval Institute Proceedings, November 1992, pp. 30-33.

Truver, Scott C. "Tomorrow's Fleet: Part II." U.S. Naval Institute Proceedings, July 1992, pp. 61-69.

_____. "Weapons that Wait...and Wait...." U.S. Naval Institute Proceedings, February 1988, pp. 31-40.

U.S. Dept. of Defense. Conduct of the Persian Gulf War: Final Report to Congress. Washington: 1992.

U.S. Joint Chiefs of Staff. Joint Doctrine for Amphibious Operations. JOINT PUB 3-02. Washington: 1992.

_____. Joint Doctrine for Barriers, Obstacles, and Mine Warfare. JOINT PUB 3-15. Washington: 1993.

_____. National Military Strategy of the United States. Washington: 1992.

U.S. Navy Dept. ...From the Sea: Preparing the Naval Service for the 21st Century. Washington: 1992.

_____. Mine Countermeasures Planning and Procedures. NWP 27-1-1 (REV. B). Norfolk, VA: 1993.

_____. Surface Mine Countermeasures Operations. NWP 27-2 (REV. B). Washington: 1993.

_____. The Commander's Handbook on the Law of Naval Operations. NWP 9 (REV. A) FMFM 1-10. Washington: 1989.